

REMARKS

Claims 1, 15, 40, 43, and 44 have been amended. Upon entry of this Amendment, Claims 1-27, and 35-44 are pending, with claims 3, 13, 18, and 26 being withdrawn from consideration at this time. Claim 40 has been amended to correct an informality. Support for the amendments to claims 1, 15, 43, and 44 may be found in the specification, at least, at paragraphs [0045] – [0046]. No new matter has been added.

Applicants appreciate the courtesy extended by the Examiner to conduct a personal interview on September 7, 2005 with Applicant Colgate and the undersigned. The substance of the interview is reflected in the remarks presented herein.

In the Office Action dated May 31, 2005, the drawings were objected to because Figures 1A and 1B were not in proper condition for scanning. Applicants are filing a complete set of formal drawings herewith. In view of the filing of formal drawings, Applicants respectfully request that the objection to the drawings be withdrawn.

In the Office Action, claims 36, 40, and 44 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse this rejection.

Claim 36 depends from claim 1, and recites “[t]he intelligent assist device of claim 1, further comprising an overhead rail on which the trolley moves, wherein the higher frequency band includes a frequency associated with a torsional oscillation of the overhead rail.” As discussed during the interview and in Applicants’ specification (see paragraph [0041]), higher frequency modes that are associated with torsional oscillation of the bridge rail and may lead to instability in the intelligent assist device (“IAD”). As discussed during the interview, it is known in the art that any such torsional oscillations will be sensed by the sensor in the device. Because the controller of the IAD is configured to estimate an amount of oscillation in the support in a higher frequency band (in which the torsional oscillations will be a part of – if present) by isolating signals received from the sensor that are within the higher frequency band, the controller does not need to specifically recognize torsional oscillation, as asserted by the Examiner. Applicants respectfully submit that claim 36 fully complies with the written description requirement of 35 U.S.C. §112, and respectfully request that the rejection to claim 36 be withdrawn.

Claim 40 depends from claim 15, and recites “[t]he method of claim 15, wherein the intelligent assist device includes an overhead rail on which the trolley moves, and wherein the higher frequency band includes a frequency associated with a torsional oscillation of the

overhead rail.” Because the method for controlling movement of an overhead trolley in an IAD includes estimating an amount of oscillation in the device in a higher frequency band (which includes any torsional oscillations that are present) by isolating signals received from the sensor that are within the higher frequency band, “estimating” does not need to include specifically recognizing the torsional oscillations, as asserted by the Examiner. Applicants respectfully submit that claim 40 fully complies with the written description requirement of 35 U.S.C. §112, and respectfully request that the rejection to claim 40 be withdrawn.

Claim 44 recites an IAD that includes “a controller operatively coupled with the sensor and the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a frequency mode associated with a torsional oscillation of the overhead rail by isolating signals received from the sensor that are in said frequency mode, and 2) adjust movements of the trolley based on the estimation.” As discussed during the interview (and above), torsional oscillations, as well as other high frequency oscillations that tend to generate instability in the IAD will be sensed by the sensor in the device. The sensor and the controller do not need to specifically recognize that the amount of oscillation in the support attributed to the torsional oscillation. As claimed, the controller is configured to estimate an amount of oscillation in a frequency mode associated with a torsional oscillation. As is clearly described in the specification, such a frequency mode also includes self-sustained oscillations of the sort shown in FIG. 3b. (See paragraph [0041].) Applicants respectfully submit that claim 44 fully complies with the written description requirement of 35 U.S.C. §112, and respectfully request that the rejection to claim 44 be withdrawn.

In the Office Action, claims 1, 35, 37, 39, and 41 were rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse this rejection.

As discussed at length, and even demonstrated by Applicant Colgate, during the interview, it is well known in the art that systems may possess more than one natural frequency. As Applicants’ specification clearly explains, intelligent assist devices that carry a payload exhibit two natural frequency modes of vibration, including a lowest frequency mode, in which the swinging motions of the support and the payload are in phase with one another, and a higher frequency mode, in which the two swinging motions are out of phase with one another. (See specification at [0039] – [0040].) It is the oscillations that are associated with the higher frequency mode that may create instability in the system.

(Specification at [0041].) Accordingly, Applicants respectfully submit that claims 1, 35, 37, 39, and 41 fully comply with 35 U.S.C. §112, second paragraph and respectfully request that the rejection to claims 1, 35, 37, 39, and 41 be withdrawn.

In the Office Action, claims, 1, 2, 4, 11, 12, 14-17, 19, 27, and 35-44 were rejected under 35 U.S.C. §102(e) as being anticipated by or, in the alternative under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,796,447 to Laundry et al. (hereinafter “the ‘447 patent”), or in the alternative. Applicants respectfully traverse this rejection.

The ‘447 patent discloses the problem of “a pendulum effect of the lifted load swinging back and forth.” (‘447 patent at col. 1, lns. 21-22.) As discussed during the interview, this “pendulum effect” described by the ‘447 patent is in the lowest frequency mode that is discussed in Applicants’ specification at paragraphs [0039]-[0041] and is shown in FIG. 3a. The ‘447 patent doesn’t even address the higher frequency mode because the ‘447 patent is not about the higher frequency mode. Instead, the ‘447 patent discloses “a control strategy that is based on estimating the force applied by the operator to the load and, subject to a variable desired load impedance, reacting in response to this estimate.” (‘447 patent at col. 1, lns. 42-46.) The ‘447 patent clearly only addresses in-phase swinging of the cable and the load.

Independent claim 1 of the present application, as amended, recites an intelligent assist device that includes, *inter alia*, “a controller operatively coupled with the sensor and the trolley, the controller controlling movements of the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band, and 2) adjust movements of the trolley based on the estimation, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device.” The ‘447 patent does not disclose or suggest all of the features of claim 1.

As explained by Applicants’ specification at [0039] and [0040], and discussed at length during the interview, there are two natural modes of vibration of a typical cable based IAD. The lowest frequency mode includes the frequency of the swinging motion of the support that is in phase with the swinging motion of the payload, as illustrated by FIG. 3a. The higher frequency mode includes the frequency in which the two swinging motions are out of phase with one another, as illustrated by FIG. 3b. Moreover, Applicants explain that

there are even higher frequency modes that are associated with torsional oscillation in the overhead rail.

The '447 patent does not even discuss frequency modes or bands. Applicants respectfully submit that the pendulum effects that the Examiner discusses in the Office Action at page 5 are also contained within this lower frequency mode, as the lifted load swings back and forth in phase with the cable. The '447 patent simply does not disclose or even remotely suggest an IAD with a controller that is "configured to 1) estimate an amount of oscillation in the support in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band, and 2) adjust movements of the trolley based on the estimation" as claimed by claim 1.

Dependent claims 2-14 and 35-38 contain additional advantageous features of the invention that are not taught or suggested by the '447 patent. Accordingly, Applicants submit that independent claim 1 and claims 2-14, and 35-38 that depend from claim 1 are patentable over the '447 patent and respectfully request that the rejection to claims 1, 2, 4, 11, 12, 14, and 35-38 be withdrawn.

Independent claim 15 of the present application, as amended, recites a method for controlling movement of an overhead moveable trolley in an intelligent assist device that includes, *inter alia*, "estimating an amount of oscillation in the device in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band; and adjusting movements of the trolley based upon the estimate, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device." The '447 patent does not disclose or suggest these features.

As discussed above, Applicants' specification discloses that the lowest frequency mode includes the frequency of the swinging motion of the support that is in phase with the swinging motion of the payload, as illustrated by FIG. 3a; this is the same type of motion, and, hence, frequency mode, that is described by the '447 patent. The '447 teaches estimating the motion imparted to the support by the operator, and adjusting the movement of the crane based on the estimated force applied by the operator. The pendulum effects that the Examiner discusses in the Office Action at page 5 are also contained within this lower frequency mode, as the lifted load swings back and forth in phase with the cable. The '447 patent simply does not disclose or even suggest all of the features of claim 15.

Dependent claims 16-27, and 39-42 contain additional advantageous features of the invention that are not taught or suggested by the '447 patent. Accordingly, Applicants submit that claims 15-27, and 39-42 are patentable over the '447 patent and respectfully request that the rejection to claims 15-17, 19, and 39-42 be withdrawn.

Independent claim 43, as amended, recites an IAD that includes, *inter alia*, "a controller operatively coupled with the sensor and the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a frequency mode in which the support and the payload swing out of phase with one another by isolating signals received from the sensor that are in said frequency mode, and 2) adjust movements of the trolley based on the estimation." The '447 patent is discussed at length above. Because the '447 patent does not disclose or even suggest all of the features of claim 43, Applicants respectfully submit that claim 43 is patentable over the '447 patent and respectfully request that the rejection to claim 43 be withdrawn.

Independent claim 44, as amended, recites an IAD that includes, *inter alia*, "a controller operatively coupled with the sensor and the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a frequency mode associated with a torsional oscillation of the overhead rail by isolating signals received from the sensor that are in said frequency mode, and 2) adjust movements of the trolley based on the estimation. The '447 patent is discussed at length above. Because the '447 patent does not disclose or even suggest all of the features of claim 44, Applicants respectfully submit that claim 44 is patentable over the '447 patent and respectfully request that the rejection to claim 44 be withdrawn.

In the Office Action, claims 1, 11, 12, 14-16, 27, and 35-44 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,575,317 to Taylor (hereinafter "the '317 patent"). Applicants respectfully traverse this rejection.

Amended claim 1 is discussed above. The '317 patent does not disclose or suggest all of the features recited by claim 1. Like the '447 patent, the '317 discusses a pendulum effect of the lifted load swinging back and forth, and does not disclose a higher frequency mode, or a higher frequency band that is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device. As was discussed during the interview and is clearly explained in Applicants' specification, the "pendulum effect," or the support and payload moving in phase with one another, is contained within the lower frequency band.

As such, the '317 does not disclose or suggest an IAD that includes "a controller operatively coupled with the sensor and the trolley, the controller controlling movements of the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band, and 2) adjust movements of the trolley based on the estimation, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device," as recited by claim 1. Dependent claims 2-14, and 35-38 contain additional advantageous features of the invention that are not taught or suggested by the '317 patent. Accordingly, Applicants respectfully submit that claims 1-14, and 35-38 are patentable over the '317 patent and respectfully request that the rejection to claims 1, 11, 12, 14, and 35-38 be withdrawn.

Amended independent claim 15 is discussed above. The '317 patent does not disclose or suggest all of the features of claim 15. As discussed above, the pendulum effects described by the '317 patent are contained within what Applicants have described as the lower frequency mode, as the lifted load swings back and forth in phase with the cable. Thus the '317 patent does not disclose or suggest "estimating an amount of oscillation in the device in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band; and adjusting movements of the trolley based upon the estimate, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device," as recited in claim 15. Accordingly, Applicants submit that independent claim 15 and claims 16-27, and 39-42 that depend from claim 15 are patentable over the '317 patent, and respectfully request that the rejection to claims 15, 16, 27, and 39-42 be withdrawn.

Amended claim 43 and the '317 patent are discussed above. Because the '317 patent does not disclose or even suggest all of the features of claim 43, Applicants respectfully submit that claim 43 is patentable over the '317 patent and respectfully request that the rejection to claim 43 be withdrawn.

Amended claim 44 and the '317 patent are discussed above. Because the '317 patent does not disclose or even suggest all of the features of claim 44, Applicants respectfully submit that claim 44 is patentable over the '317 patent and respectfully request that the rejection to claim 44 be withdrawn.

In the Office Action, claims 5-7, 9, 10, 20-22, 24, and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over the '447 patent in view of U.S. Patent No.

6,460,711 to Kato et al. (hereinafter “the ‘711 patent”). Applicants respectfully traverse this rejection.

Claims 5-7, 9, and 10 depend from independent claim 1. As discussed above, independent claim 1 is patentable over the ‘447 patent. The ‘711 patent does not cure the deficiencies of the ‘447 patent. The ‘711 patent teaches a suspension type hoisting apparatus that is able to suppress sway of a part of the apparatus in a short time. (‘711 patent at col. 6-10.) Like the pendulum motions described by the ‘447 patent, Applicants respectfully submit that the “sway” described by the ‘711 patent, and illustrated in FIG. 3a, also falls within the lower frequency band. The ‘711 also teaches that “observation noise” in the system may be filtered by a low-pass filter. (‘711 patent at col. 6, lns. 58-61.)

The ‘711 patent does not disclose or suggest an IAD with “a controller operatively coupled with the sensor and the trolley, the controller controlling movements of the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band, and 2) adjust movements of the trolley based on the estimation, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device,” as recited by claim 1. Dependent claims 5-7, 9, and 10 contain additional advantageous features of the invention that are not taught or suggested by the ‘447 patent or the ‘711 patent. Accordingly, because the combination of the ‘447 patent and the ‘711 patent does not disclose or suggest all of the features of claims 5-7, 9, and 10, Applicants respectfully submit that claims 5-7, 9, and 10 are patentable over the ‘447 patent in view of the ‘711 patent, and respectfully request that the rejection be withdrawn.

Claims 20-22, and 24 depend from independent claim 15. As discussed above, independent claim 15 is patentable over the ‘447 patent. The ‘711 patent does not cure the deficiencies of the ‘447 patent. The ‘711 patent does not disclose or suggest a method for controlling movement of an overhead trolley in an IAD that includes “estimating an amount of oscillation in the device in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band; and adjusting movements of the trolley based upon the estimate, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device,” as recited by claim 15. Claims 20-22, and 24 contain additional advantageous features of the invention that are not taught or suggested by the ‘447 patent or the ‘711 patent. Accordingly, because

the combination of the '447 patent and the '711 patent does not disclose or suggest all of the features of claims 20-22, and 24, Applicants respectfully submit that claims 20-22, and 24 are patentable over the '447 patent in view of the '711 patent, and respectfully request that the rejection be withdrawn.

In the Office Action, claims 8 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over the '447 patent in view of the '711 patent as applied to claims 5 and 9 above, and further in view of U.S. Patent No. 4,284,978 to Yucius (hereinafter "the '978 patent"). Applicants respectfully traverse this rejection.

Claim 8 depends from dependent claim 5. As discussed above claim 5 is patentable over the '447 patent in view of the '711 patent. The '978 patent does not cure the deficiencies of the '447 and '711 patents. The '978 patent discloses a control system for a conveying or hoist system. ('978 patent, col. 1, lns. 5-13.) The '978 patent does not disclose or suggest that there is a sensor that senses a characteristic of motion imparted by a human operator to the device, or "a controller operatively coupled with the sensor and the trolley, the controller controlling movements of the trolley, the controller being configured to 1) estimate an amount of oscillation in the support in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band, and 2) adjust movements of the trolley based on the estimation, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device," as recited by claim 1, and claim 8 by its dependency. Accordingly, because the combination of the '447 patent, the '711 patent, and the '978 patent does not disclose or suggest all of the features of claim 8, Applicants respectfully submit that claim 8 is patentable over the '447 patent in view of the '711 patent, and further in view of the '978 patent, and respectfully request that the rejection be withdrawn.

Claim 23 depends from claim 19. As discussed above, claim 19 is patentable over the '447 patent in view of the '711 patent. The '978 patent does not cure the deficiencies of the '447 and '711 patents. The '978 patent does not disclose or suggest a method for controlling movement of an overhead trolley in an IAD that includes "estimating an amount of oscillation in the device in a higher frequency band by isolating signals received from the sensor that are within the higher frequency band; and adjusting movements of the trolley based upon the estimate, wherein the higher frequency band is above a lower frequency band that contains the lowest natural frequency mode of oscillation of the device," as recited by claim 15, and claim 23 by its dependency. Accordingly, because the combination of the '447

patent, the '711 patent, and the '978 patent does not disclose or suggest all of the features of claim 23, Applicants respectfully submit that claim 23 is patentable over the '447 patent in view of the '711 patent, and further in view of the '978 patent, and respectfully request that the rejection be withdrawn.

In the Office Action, claims 4-7, 9, 10, 19-22, 24, and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over the '317 patent in view of the '711 patent. Applicants respectfully traverse the rejection.

Claims 4-7, 9, and 10 depend from claim 1, and claims 19-22, 24, and 25 depend from claim 15. The '317 and '711 patents are discussed above. Because the combination of the '317 patent and the '711 patent does not disclose or suggest all of the features of claims 1 and 15, Applicants respectfully submit that claims 4-7, 9, 10, 19-22, 24, and 25 are patentable over the '317 patent in view of the '711 patent and respectfully request the rejection to claims 4-7, 9, 10, 19-22, 24, and 25 be withdrawn.

In the Office Action, claims 8 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over the '317 patent in view of the '711 patent as applied to claims 5 and 19, and further in view of the '978 patent. Applicants respectfully traverse this rejection.

Claim 8 depends from claim 5, and claim 23 depends from claim 19. As discussed above, claims 5 and 19 are patentable over the '317 patent in view of the '711 patent. The '978 patent is discussed above. Because the combination of the '317 patent in view of the '711 patent in view of the '978 patent does not disclose or suggest all of the features of claims 8 and 23, Applicants respectfully submit that claims 8 and 23 are patentable over the '317 patent in view of the '711 patent in view of the '978 patent, and respectfully request that the rejection to claims 8 and 23 be withdrawn.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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